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In all kinds of wood, he says, there are two sorts of grain,—the false or bastard, and the true or silver grain. The former consists of the concentric circles which mark the annual increase of the tree; and the latter is composed of thin laminæ, diverging in every direction from the medulla to the bark, with different degrees of adhesion to each other at different seasons, and lying between and pressing on the sap-vessels of the alburnum.

If these laminæ are expansible under various changes of temperature, or from any other cause arising from the powers of vegetable life, our author conceives that they are as well placed as is possible to propel the sap to the extremities of the branches. That they are affected by the changes of temperature in the air is proved by the effects of these changes on them even after the tree is dead, as in the instance of boards, which warp more or less, according to the direction of this grain: and other instances are given of the effects of solar heat on different parts of plants, which materially favour this assertion.

The general conclusions derived from these experiments are, That the tubes of the alburnum, acted upon by the agency of the silver grain, are in fact the channels which, extending from the extremities of the roots to the points of the annual shoots, convey the nutritious juices to the base of the buds, and in the soft and succulent part of the annual shoot, where the alburnum with the silver grain ceases to act, and where commences the action of the central vessels, with their appendages the spiral tubes;—that having through these reached the end of the leaves, the sap undergoes a change, perhaps from the action of the atmosphere, and is then brought back again through the external vessels of the leaf-stalks to the bark, which conveys it to every part of the tree, and ultimately contributes to its growth.

In speaking of the use of the medulla, the author assigns his reasons for considering it as a reservoir of moisture, which it occasionally imparts to the leaves and fruit through the central vessels, and which these organs must often stand in need of, as they cannot, like animals, resort to the brook or shade. The heart or coloured wood of the trees he considers as the bones in the animal œconomy, being intended to support them against the effects of winds and other destructive agents; and, accordingly, it is not found in roots or tender shoots, but is only formed when the vegetable has acquired a bulk which renders such a structure necessary.

Additional Observations tending to investigate the Symptoms of the variable Emission of the Light and Heat of the Sun; with Trials to set aside darkening Glasses, by transmitting the Solar Rays through Liquids; and a few Remarks to remove Objections that might be made against some of the Arguments contained in the former Paper. By William Herschel, LL.D. F.R.S. Read May 14, 1801. [Phil. Trans. 1801, p. 354.]

This may be considered as a supplement to Dr. Herschel's paper on the nature of the sun, lately read to the Society, and consists

chiefly of a continuation of his observations on the appearances of that body from the 2nd of March to the 3rd of May last.

Conceiving that there might be some advantage in getting rid of the darkening glasses in viewing the sun, he was led to substitute for them various liquors, such as spirits of wine, port wine, ink diluted with water, a solution of green vitriol with a small proportion of tincture of galls, and even plain water; which latter he found keeps off the heat so effectually, that the brightest sun may be viewed some time through it without any inconvenience.

Through diluted ink, the image of the sun appeared as white as snow; and when the liquor was still more diluted, the sun was of a purple hue, while the objects on its surface continued as distinct as when seen through any other medium. From these observations the author infers that the continuance of the symptoms which in his former paper he considered as favourable to the copious emission of light and heat from the sun, are sufficiently verified, and that by comparing these phænomena with the corresponding mildness of the season, his arguments respecting the connexion between them and the temperature of our atmosphere acquire no small degree of probability.

Being well aware that the price of wheat which he adopted in his former paper as a criterion of the seasons is liable to some objections, the author desires here to be understood, that his intention was merely to compare the astronomical fact of the variable emission of the sun's rays with the obvious symptoms corresponding with that circumstance; leaving it to others to apply the subject to such useful œconomical purposes as may be found to have any relation to them: at any rate, he cannot relinquish the hope that astronomy will ultimately supply us with the means of deriving certain prognostics of the temperature of the seasons from accurate observations on the quantity of the light we receive from the sun.

On an improved Reflecting Circle. By Joseph de Mendoza Rios, *Esq.*
F.R.S. Read June 4, 1801. [*Phil. Trans.* 1801, p. 363.]

The great utility of Hadley's quadrant in practical astronomy, and particularly in navigation, has given rise to several improvements of that valuable instrument, of which some account is premised in the present paper. The first of these is due to the celebrated Tobias Meyer, who, by completing the limb of the sextant into a whole circle, and adding an horizon index, enabled us to repeat the observations, so as to ascertain the double, triple, and even a greater multiple of the angles; by which means the errors of division or eccentricity in the instrument can be reduced in the inverse ratio of the repetition of the observations, so as to arrive at any degree of approximation that may be required.

Some imperfection still remaining as to the manner of rendering the glasses parallel, so as to produce the exact coincidence of the images, the Chevalier de Borda contrived a method of rendering this exact parallelism of less consequence, by substituting the immediate